

**REMARKS**

Claim 15-19 and 22-35 are pending. Claims 15, 19, and 24-27 are amended. Claims 20 and 21 are Cancelled. Claims 31-35 have been added. Applicant requests reconsideration and reexamination of the pending claims.

Claims 15-30 are rejected over a combination of the *Ollivier* (U.S. Patent No. 6,363,958) in view of *Tsourides et al.* (U.S. Patent App. No. 2002/0038673) and *Porter et al.* (U.S. Patent App. No. 2002/0124961).

The arrangement of components of the mass flow controller of the present invention provide a “cancelling” of perturbations to the flow rate caused from fluctuations in pressure at either the inlet or outlet sides of the mass flow controller.

Claim 15 sets forth, *inter alia*, “said pressure sensor unit operatively mounted in the fluid passageway in such close proximity to said flow rate sensor unit that measurement and adjustment of the pressure in said fluid passageway is kept substantially constant at the flow rate sensor unit.” In addition Claim 15 sets forth, “the control unit configured to provide a first control signal to said pressure control valve unit in response to said pressure signal to avoid an effect on the flow rate in the fluid passageway due to a pressure fluctuation at the inlet of the mass flow controller, and the control unit configured to provide a second control signal to said flow rate control valve in response to said flow rate signal to avoid an effect on the flow rate in the fluid passageway due to a pressure fluctuation at the outlet of the mass flow controller.”

Claim 19 sets forth, *inter alia*, “a controller for controlling the pressure control valve in response to an output of the pressure sensor to avoid an effect on the flow rate due to a pressure fluctuation at the inlet of the mass flow controller and for controlling the flow rate control valve

in response to an output of the flow rate sensor to avoid an effect on the flow rate due to a pressure fluctuation at the outlet of the mass flow controller.”

As set forth in the claims, the pressure control valve 4 and flow rate sensor 5 are arranged side by side, and the second passage 2b disposed between them is designed as short as possible, so that the time delay of pressure  $P_c$  with respect to the output of the control signal  $C_p$  of the pressure control valve 4 is minimized, and thus fluctuations of pressure  $P_c$  in the section of the flow rate sensor 5 are made as small as possible.

Further, in the second passage 2b between the pressure control valve 4 and flow rate sensor 5, the pressure sensor 7b is disposed at a position as close to the flow rate sensor 5 as possible, so that measurement of the pressure and adjustments thereto can be controlled with signal  $C_p$  with minimal delay, to provide a substantially constant pressure in the immediate vicinity of the flow rate sensor. As a result, the control accuracy and stability of flow rate by the mass flow controller 1 can be enhanced.

As set forth in the claims, the control unit controls the pressure control valve 4 using feedback of the specified pressure  $P_c$  adjacent the flow rate sensor by using the pressure signal  $S_{pb}$  from the pressure sensor 7b. Therefore, if the inlet side pressure  $P_1$  of the mass flow controller 1 fluctuates due to some effects, the pressure  $P_c$  at the flow rate sensor can be kept substantially constant so as to allow the flow rate sensor to measure accurately.

The control unit also controls the flow rate control valve 6 using feedback so that the measured flow rate  $F$  may conform to the preset flow rate  $F_s$  by using the flow rate signal  $S_f$  from the flow rate sensor 5. Therefore, if the outlet side pressure  $P_2$  of the mass flow controller 1 fluctuates, the flow rate is free from its effects.

These claimed features are not found on the *Ollivier* reference.

Instead, the *Ollivier* reference discloses a method of controlling a batchwise delivery of process gas for semiconductor manufacturing using the flow control system 10 in conjunction with a conventional mass flow control valve 22. A batch of process gas is delivered from a source of pressurized process gas through the flow line 1 of the flow control system 10 to the semiconductor manufacturing apparatus 2 at a controlled flow rate for a predetermined delivery period of time.

*Ollivier* discloses that the actual flow during the delivery phase is measured and the command to the mass flow control valve is adjusted so that the actual flow is kept equal to the set point value in the following delivery phase(s). This operation may be repeated at each delivery phase or after a desired number of delivery phases. The actual value is compared to the desired set point value. If there is any difference between the two values, the flow control system modifies the command signal sent to the mass flow control valve 22 so that the difference (error signal) is reduced to zero.

*Ollivier* fails to teach or suggest a pressure sensor and a flow rate sensor disposed between a pressure control valve and a flow rate control valve, where the sensors provide signals used by a controller to set and maintain a constant flow rate through the mass flow controller. In contrast, the present invention has the capacity of removing any consequences of an initial pressure fluctuation  $\Delta$  on the inlet side pressure  $P_1$  or a subsequent pressure fluctuation  $\Delta$  on the outlet side pressure  $P_2$ .

Applicant has reviewed *Tsourides and Porter et al.* and could not find any teaching or suggestion that when combined with *Ollivier* would cure the deficiencies of *Ollivier*.

Accordingly, Claims 15 and 19 are allowable over *Ollivier* in view of *Tsourides* or *Porter et al.* Allowance of Claims 15 and 19 is hereby solicited.

Claims 16-18 and 31 depend from Claim 15 and are allowable for at least the same reasons as Claim 15. Claims 22-30 depend from Claim 19 and are allowable for at least the same reasons as Claim 19.

As can be appreciated by the cited references of record, this is a very crowded field with a number of skilled engineers attempting to provide improvements, particularly in the manufacturing of semiconductor products. The advantages of our invention, however, provide significant advancements that are not taught in the cited references of record.

“Thus when differences that may appear technologically minor nonetheless have a practical impact, particularly in a crowded field, the decision-maker must consider the obviousness of the new structure in this light.”

*Continental Can Co. USA Inc. v. Monsanto Co.*, 20 U.S.P.Q. 2d. 1746, 1752 (Fed. Cir. 1991).

Our recent discussion with Pinchus Laufer in the Office of Patent Legal Administration, who was involved in writing the Examination Guidelines for Determining Obviousness under 35 USC § 103 in view of the Supreme Court decision in *KSR International Co. vs. Teleflex, Inc.* verified that the KSR decision still required a specific rationale that could not be based on hindsight for purportedly combining the elements in the prior art to meet an invention defined in the patent claims.

Mr. Laufer incorporated the following from the existing MPEP into the Guidelines.

As noted in the MPEP at §2143.02:

A rationale to support a conclusion that a claim would have been obvious is that all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art. *KSR International Co. v. Teleflex Inc.*, 550 U.S. \_\_\_, \_\_\_, 82 USPQ2d 1385, 1395 (2007); *Sakraida v. AG Pro, Inc.*, 425 U.S. 273, 282,

189 USPQ 449, 453 (1976); *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, 62-63, 163 USPQ 673, 675 (1969); *Great Atlantic & P. Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 152, 87 USPQ 303, 306 (1950). (underline added)

The present claims, such as Claim 32, is defined with a "control means for" claim element under 35 U.S.C. §112, sixth paragraph.

As such, the U.S. Patent Office must consider the function and also the equivalent structure defined in our specification. The proposed combination of three references relies upon a principal *Ollivier* reference having a function of controlling a batchwise delivery of processed gas using a conventional mass flow control valve. This flow control system delivers the gas from a source of pressurized processed gas at a controlled flow rate for a delivery period of time. The control is effectuated by measuring the difference between an actual value and a set point value to a modified command signal sent to the mass flow control valve to reduce any differences to zero.

As can be readily determined, the functioning of the *Ollivier* reference is not the same as set forth in our current claims, including the newly drafted Claim 32.

In fact, the *Ollivier* reference does not suggest a pair of sensors to provide signals to a controller to set and maintain a constant flow rate to the mass flow controller. It does not recognize nor address the consequences of any initial pressure fluctuations on the inlet side pressure nor subsequent pressure fluctuation from the outlet side pressure.

The secondary references of *Torres* and *Porter et al.* are apparently taken in hindsight from the present disclosure and application. There is no suggestion or teaching as how they would provide equivalent functions.

As noted above, combining the elements from prior art references should be done with no change in respect to functions, and the combination should be provided so that it would yield nothing more than predictable results to one of ordinary skill in this field.

It is submitted that the guidelines of *KSR International Co.* and MPEP §2143.02 have not been satisfied.

It is the Examiner's burden to establish *prima facie* obviousness. See *In re Rijckaert*, 9 F.3d 1531, 1532 (Fed. Cir. 1993) Obviousness requires a suggestion of all the elements in a claim (*CFMT, Inc. v. Yieldup Int'l Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003)) and "a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007). Here, we find that the Examiner has not identified all the elements of claim 1, nor provided a reason that would have prompted the skilled worker to have arranged them in the manner necessary to reach the claimed invention.

*Ex parte* Karoleen B. Alexander, No. 2007-2698, slip op. at 6 (B.P.A.I. Nov. 30, 2007)

Applicant further submits that any combination of references that must be modified beyond their functions is suggestive of an unintended use of hindsight that may have been utilized to drive the present rejection. This is particularly true for an examiner who is attempting to provide a diligent effort that only patentable subject matter occurs. However, the KSR Guidelines do not justify such an approach. There is still a requirement for the Examiner to step back from the zeal of the examination process and to appreciate that a Patent Examiner has to wear both hats of advocating a position relative to the prior art while at the same time objectively rendering in a judge-like manner a decision on the patentability of the present claims.

As set forth in MPEP 2142,

To reach a proper determination under 35 U.S.C. §103, the examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the

invention was unknown and just before it was made. In view of all factual information, the examiner must then make a determination whether the claimed invention "as a whole" would have been obvious at that time to that person. Knowledge of applicant's disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the "differences," conduct the search and evaluate the "subject matter as a whole" of the invention. The tendency to resort to "hindsight" based upon applicant's disclosure is often difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

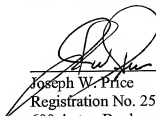
Lacking any explicit analysis and articulation as to how the *Ollivier* reference could be combined with no change in its respective function with the resulting hypothetical combination of secondary references to yield nothing more than a predictable result to a person of ordinary skill in the field, is suggestive of hindsight.

In view of the above comments and the amendment to the claims, it is believed that the present application is in condition for allowance and early notification of the same is requested.

If the Examiner believes a telephone interview will further the prosecution of this matter, the undersigned attorney can be contacted at the listed phone number.

Very truly yours,

**SNELL & WILMER L.L.P.**



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